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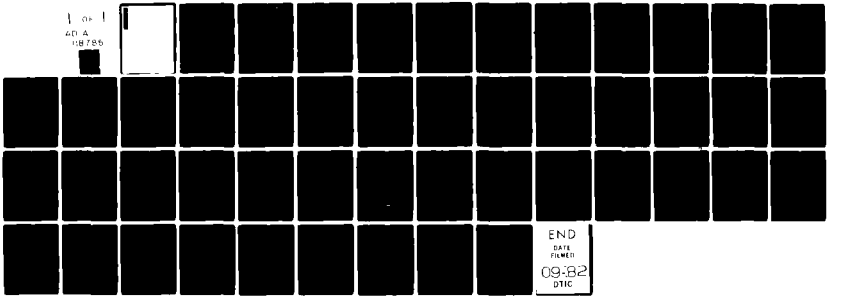

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DEVELOPMENT AND EVALUATION OF STRONG-CAMPBELL INTEREST INVENTORY SCALES TO MEASURE INTERESTS OF MILITARY OCCUPATIONAL SPECIALTIES OF THE MARINE CORPS

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The purpose of this investigation was to develop and evaluate scales, using the item pool of the Strong-Campbell Interest Inventory (SCII) to measure interests of 12 specified MOSs. The empirical method of contrast groups was used for scale development using 4 different reference samples and 11 MOS criterion samples; these comparisons extracted sufficient items for 39 scales. Reliability and validity of each scale were assessed in three phases. Results indicated that useful scales could be developed for most of the

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MOSs (except infantry and artillery) if sufficient samples could be obtained. It was recommended that an attempt be made to collect larger samples for those scales developed with small sample sizes.

FOREWORD

This research and development (R&D) effort was conducted under contract N66001.78.C.0198 with the Center for Interest Measurement Research in support of exploratory development task area ZF63-521-080-101 (Marine Corps Personnel Resources Management). It was sponsored by the Commandant, U.S. Marine Corps (MPI-20). The overall project was initiated in response to a request from the Officer Assignment Branch, Headquarters, Marine Corps, to develop an objective classification system for assigning officer students at The Basic School, Quantico to their first military occupational specialties (MOSs). The purpose of the R&D reported here was to develop scales to measure interests of students in 12 specified MOSs. These interest scales may be further evaluated in a subsequent phase that would also assess the usefulness of achievement and aptitude measures for classification purposes.

Appreciation is expressed to Major B. T. Babin, Headquarters, Marine Corps, for his coordination efforts in providing the samples used in the undertaking.

The contracting officer's technical representative was Ms. Rebecca Hetter.

JAMES F. KELLY, JR.
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SUMMARY

Problem

Although military occupational specialties (MOSs) for officers of the U.S. Marine Corps are assigned according to the quota needs of the Marine Corps, consideration of an individual's interests in determining assignments could contribute to greater job satisfaction.

Objective

The objective of this effort was to develop and evaluate scales, using the item pool of the Strong-Campbell Interest Inventory, to measure interests for 12 MOSs. The MOSs were infantry, artillery, engineer, tank, amphibian vehicle, communication, ground supply, aviation supply, data systems, antiair warfare, air support, and air defense.

Approach

The empirical method of contrast samples was employed to develop the scales. Four reference samples were used as the contrast samples: men in general (GRS); marines in general (MRS); a selected combination of marines from five of the 12 MOSs under study (MIX); and students from The Basic School (TBS). Samples from each of the 12 MOSs were collected to use as the criterion samples. Once constructed, every scale was evaluated for reliability and validity.

Results

Thirteen scales were identified as best representing the criterion samples. Further analyses were carried out to assess the potential of each scale to measure the desired interests and to meet Marine Corps quota needs. The MOSs that appeared most conducive to successful evaluation were the engineer, tank, amphibian vehicle, communication, ground supply, aviation supply, and data systems MOSs.

Conclusions

Useful scales probably could be constructed for every MOS except infantry and artillery if sufficient samples could be obtained. The best scales in this study represented the MOSs with sample sizes of at least 75 subjects.

Recommendations

Before these scales are considered for operational use, the following steps must be accomplished:

1. Further attempts should be made to increase sample sizes and reconstruct scales for those criterion samples with fewer than 75 subjects.

2. Studies of predictive validity should be initiated for all of the potentially useful scales.

3. The scales for the infantry and artillery MOSs did not appear to contribute anything to the identification of the criterion sample interests and probably should be discarded.

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INTRODUCTION

Problem

Development and retention of officer personnel are important objectives of the U.S. Marine Corps. Officers are assigned to military occupational specialties (MOSs) depending primarily on the quota needs of the Marine Corps. However, within the quota requirements, the appropriateness of assignments and the job satisfaction of the officers could possibly be improved by considering individual aptitudes and interests.

Objective

The objective of this effort was to develop and evaluate scales, using the item pool of the Strong-Campbell Interest Inventory (SCII), to measure interests of 12 MOSs. The MOSs are infantry, artillery, engineer, tank, amphibian vehicle, communication, ground supply, aviation supply, data systems, antiair warfare (AAW), air support, and air defense.

Background

The SCII and the Strong Vocational Interest Blank (SVIB), from which the SCII evolved, have been used for over 50 years to measure and study vocational interests. The foundation for the SCII is in its empirically constructed occupational scales. The technique used to develop the SVIB-SCII scales has been well-documented (Strong, 1943; Campbell, 1971, 1977; Campbell & Hansen, 1981). Generally speaking, if criterion samples with homogeneous interests can be collected, occupational scales that measure those interests can be developed and verified as reliable and valid.

APPROACH

MOS Questionnaire

A questionnaire was designed to identify subjects whose interests represented each of the MOSs under investigation. The usual procedure for assigning subjects to occupational criterion samples is to: (1) contact individuals who have chosen to enter a particular field (e.g., veterinary medicine), (2) determine their satisfaction, training, and experience, and (3) assign them to the sample if they meet all criteria. However, because of the nature of military assignments (not always the individual's choice) and because many subjects are reluctant to admit dissatisfaction with an assigned MOS, the questionnaire was used to identify their first and second choice fields regardless of their primary or billet MOS. A copy of this questionnaire appears in Appendix A.

Samples

NAVPERSRANDCEN provided the Center for Interest Measurement Research (CIMR) with mailing labels for (1) 4,723 Marine Corps officers whose primary assignments were in the 12 MOSs under investigation, to be considered as candidates for inclusion in MOS criterion samples, (2) 1,169 randomly selected Marine Corps officers, to be used to develop one of the reference samples, and (3) 615 Marine Corps officers who were Naval Academy graduates, to be used as a retest sample. Packets of materials, including the SCII, the MOS questionnaire, instructions, and the privacy act statement, were sent to the commanding officers of the 6,507 men for distribution. Usable materials were returned

by 2,806 (43.1%) of the subjects. Table 1 summarizes the rate of return for each sample group.

Table 1

Rate of Return for Sample Groups

Sample	Total Sent	Usable Materials Returned	
		Number	%
Criterion	4,723	2,162	45.8
Reference	1,169	410	35.1
Retest	615	234	38.0
Total	6,507	2,806	43.1

Criterion Samples

The following procedure was used to obtain sufficient subjects (N=50) for inclusion in the 12 MOS criterion samples:

1. Subjects who had indicated one of the 12 MOSs as their first or second choice field were included if their primary MOS and first choice field were identical, and they had at least 6 months' training and/or experience in the first choice field.

2. If Step 1 did not result in sufficient numbers, subjects who met the training and/or experience criteria and who indicated that one of the 12 MOSs under study was their first choice field but not their primary MOS were included.

3. If there were still insufficient numbers of subjects, those whose first choice field was not one of the 12 MOSs under study were included, if their second choice field was the same as their primary MOS and they had at least 6 months' experience and/or training in their second choice field.

Using this procedure, sufficient subjects were obtained for 7 of the 12 MOSs designated for study--infantry, artillery, engineer, tank, communications, ground supply, and data systems. Three of the five small criterion samples--AAW, air support, and air defense--were combined into a single sample. The fourth small sample--aviation supply (N=35)--was used experimentally to build its own scale and to build a scale in combination with the ground supply sample, even though the two groups were different in terms of SCII scientific interests and academic orientation scores (the aviation supply sample scored higher on both). The fifth small sample--amphibian vehicle (N=27)--was too dissimilar from all other groups to develop a combined sample; thus, it was used experimentally to build its own scale.

Composition and demographic data for the criterion samples are presented in Tables 2 and 3 respectively.

Table 2

Criterion and Reference Sample Composition

Sample	N	Description
	Criterion	
Infantry	295	All Ss who reported their primary MOS (infantry) as their 1st choice field.
Artillery	178	All Ss who reported their primary MOS (artillery) as their 1st choice field.
Engineer	137	All Ss who reported their primary MOS (engineer) as their 1st choice field.
Tank	77	All Ss who reported their primary MOS (tank) as their 1st choice field.
Amphibian vehicle	27	All Ss who reported their 1st choice field as amphibian vehicle, plus those whose 1st choice field was not one of the 12 MOSs under study but whose 2nd choice field (amphibian vehicle) was their primary MOS.
Communication	80	All Ss who reported their primary MOS (communications) as their 1st choice field.
Ground supply	142	All Ss who reported their 1st choice field as ground supply, plus those whose 1st choice field was not one of the 12 MOSs under study but whose 2nd choice field (ground supply) was their primary MOS.
Aviation supply	35	All Ss who reported their 1st choice field as aviation supply, plus those whose 1st choice field was not one of the 12 MOSs under study but whose 2nd choice field (aviation supply) was their primary MOS.
Ground and aviation supply	177	Combination of ground supply and aviation supply samples described above.
Data systems	105	All Ss who reported their primary MOS (data systems) as their 1st choice field.
AAW, air support, and air defense	59	All Ss who reported their 1st choice field as AAW, air support, or air defense, plus those whose 1st choice field was not one of the 12 MOSs under study but whose 2nd choice field (AAW, air support, or air defense) was their primary MOS
	Reference	
General reference sample (GRS)	300	Males from a wide variety of occupations. This sample is used as the contrast sample for SCII scale construction at CIMR.
Marine reference sample (MRS)	300	Ss randomly selected from 410 Marines officers who responded to questionnaire mailed to 1,169 officers (see Table 1).
Mixed reference sample (MIX)	289	Ss from six criterion groups: artillery (N=75), tank (N=75), communication communication (N=80), AAW (N=9), air support (N=22), and air defense (N=28).
The Basic School (TBS) sample	300	TBS students randomly selected from data for 1,536 students supplied by NAVPERSRANDCEN.

Table 3

Demographic Data for Criterion and Reference Samples

Item	Criterion Samples											Reference Samples			
	Infantry	Artillery	Engineer	Tank	Amphib. Vehicle	Comm.	Ground Sup.	Aviation Sup.	Ground/ Aviation Sup.	Data Systems	AAW, Air Support, & Air Defense	GRS	MRS	MIX	TBS
Mean age	34.5	33.3	32.9	32.2	31.7	33.7	32.5	31.4	32.3	33.1	33.3	33.4	32.5	33.2	NA
Mean years active duty	13.0	11.5	10.7	10.6	9.7	12.4	10.4	9.4	10.2	11.4	11.8	NA	10.9	11.4	NA
Career goal (%):															
No response	2.9	2.9	8.0	2.7	3.7	4.8	5.0	5.9	5.2	8.7	5.4	NA	9.7	4.3	NA
Command	96.1	93.1	83.2	96.0	85.2	73.5	51.8	47.1	50.9	43.3	85.7	NA	68.8	85.4	NA
Staff	1.1	4.0	8.8	1.3	11.1	21.7	43.2	47.1	43.9	48.1	8.9	NA	21.5	10.3	NA
Rank (%):															
Second Lieutenant	0.7	0.6	1.5	1.3	7.4	2.6	1.4	0.0	1.2	3.8	3.6	NA	27.5	1.8	NA
First Lieutenant	17.3	22.5	25.5	25.3	44.4	29.9	26.6	32.4	27.7	30.8	16.1	NA	18.8	25.3	NA
Captain	31.4	33.5	37.2	28.0	14.8	31.2	35.3	47.1	37.6	29.8	37.5	NA	24.2	33.1	NA
Major	25.1	21.4	19.7	30.7	14.8	22.1	21.6	11.8	19.7	22.1	28.6	NA	17.1	24.6	NA
Lieutenant Colonel	23.0	19.7	15.3	13.3	18.5	13.0	12.9	8.8	12.1	12.5	12.5	NA	6.0	13.9	NA
Colonel	2.5	1.7	0.7	1.3	0.0	1.3	2.2	0.0	1.7	1.0	1.8	NA	6.0	1.4	NA
Brigadier General	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	0.3	0.0	NA
Major General	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	0.0	0.0	NA
Educational Level (%):															
High school diploma	0.4	0.6	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	NA	3.0	0.4	NA
Some college	5.7	1.7	5.8	2.7	3.7	13.0	4.3	8.8	5.2	2.9	16.1	NA	13.8	7.8	NA
College degree	50.2	52.0	51.1	56.0	70.4	39.0	41.7	47.1	42.8	33.7	41.1	NA	52.0	48.4	NA
Graduate worl	43.5	45.1	42.3	40.0	25.9	46.8	54.0	44.1	52.0	63.5	42.9	NA	30.5	43.1	NA
No response	0.0	0.6	0.7	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	0.7	0.4	NA

Reference Samples

In empirical scale construction, reference samples are used to establish a base rate of popularity for questionnaire items. These base rates are then compared with the endorsement rate of the criterion sample to identify items that differentiate the two groups.

For this effort, there were four reference samples:

1. The General Reference Sample (GRS) is composed of males (N=300) from a wide variety of occupations. This sample is used as a "contrast" sample for SCII scale construction.

2. The Marine Reference Sample (MRS) was composed of officers (N=300) randomly selected from the 410 who responded to the SCII and the questionnaire (see Table 1).

3. The Mixed Reference Sample (MIX) was composed of subjects from the six criterion samples (N=289) that were most similar in terms of mean score data.

4. The TBS Student Reference Sample was composed of randomly selected students (N=300) of The Basic School (TBS), Quantico, Virginia (data for 1,536 TBS students were provided by NAVPERSRANDCEN).

Composition and demographics data for the reference samples are presented in Tables 2 and 3 respectively.

Scale Development

After the criterion and reference samples had been identified, the reference samples were used to develop four sets of scales. Set 1 scales were developed using the GRS; Set 2 scales, the MRS; Set 3 scales, the MIX; and Set 4, the TBS. As the first step in scale development, each of the 11 criterion samples was compared to each of the reference samples. Thus, if a sufficiently large number of items differentiated the two samples, it was possible that 44 scales would be developed. The following procedure was used:

1. The item response percentages of the 11 MOS criterion samples and the 4 reference samples were calculated and the percentage differences between each were calculated.

2. Items with a response percentage difference of 16 percent or greater on either the "Like" or "Dislike" response were identified, and the 60 to 70 items with the largest differences were retained. If fewer than 15 items had response percentage differences of 16 percent or greater, no scale was constructed.

3. If the criterion sample size was less than 50, the minimum response percentage difference was increased from 16 to 21 to increase the validity of the selected items and to compensate for the small sample size. For example, the amphibian vehicle sample size was 27; thus, the minimum response percentage difference was 21 percent; the resulting number of items on the Set 2 scale using the MRS reference sample was 28.

4. The largest response difference was weighted with a unit weight of one and assigned the appropriate sign. If the difference favored the criterion sample, a weight of +1 was assigned. If the difference favored the reference sample, a weight of -1 was assigned.

5. The unweighted opposite response was assigned a unit weight in the opposite direction.

6. The selected items with an "indifferent" response percentage difference of 10 percent or greater were assigned a unit weight with the appropriate sign. If the cut-off response percentage was $\geq$ 21 percent, only "indifferent" response percentages of 13 percent or greater were weighted.

Each scale was standardized, using the subjects of the respective criterion samples as the standardization samples. Raw scores were converted to a distribution of standard scores using a linear transformation with the mean set equal to 50 and the standard deviation set equal to 10.

$$\text{Standard score} = \left(\frac{X - M_C}{SD_C}\right) 10 + 50$$

where X = an individual's raw score
M_C = criterion sample raw score mean
SD_C = criterion sample raw score standard deviation

Scale Evaluation

After the four sets of scales were constructed and standardized, the reliability and validity of each scale were assessed to determine which scales should be recommended.

Reliability Analyses

Pearson product-moment correlation coefficients were computed for each scale, using three samples of varying time-lapse periods to determine scale reliability. These three samples, which were taken from CIMR archives data, consisted of (1) a 2-week test-retest group, composed of 74 males who were mostly high school seniors or college students (Sample 1), (2) a 30-day test-retest group, composed of a diverse group of 67 men (Sample 2), and (3) a 3-year test-retest group, which included 75 males in occupations ranging from semi-skilled to professional (Sample 3).

Pearson product-moment correlations were also calculated for a sample of officers who were Naval Academy graduates (N=234) and who had responded to the MOS questionnaire (see Table 1). These officers had been initially tested with the SVIB; they were retested for this study with the SCII. Because the SCII does not include all of the SVIB items, however, shortened scales were developed from items common to SCII and SVIB to accommodate the data analysis. Correlations between the long (Set 1 through Set 4) and short scales were computed to determine whether it was appropriate to generalize from conclusions about the shortened scales to conclusions about the long scales.

Validity Analyses

To determine how well each scale discriminated between people who were in a particular MOS and people in general, Tilton (1937) overlap percentages were calculated for each scale using the appropriate criterion sample versus two reference samples--the GRS (men in general) and the MRS (marines in general). Tilton overlap percentages between MOSs were also computed to assess the ability of each scale to discriminate between the criterion MOS and the other MOSs. These data provided the basis for selecting the scales that best identified the interests of the criterion samples.

To determine whether or not the selected scales had the capacity to separate occupations from each other, mean scores for each scale were calculated for (1) samples of the 10 MOSs,[1] and (2) samples taken from the CIMR archives (including Army, Navy and Air Force officers, and representatives of 60 civilian occupations). To determine the range of scores generated for TBS students and the proportion of students who scored highest on each scale (to allow comparison with Marine Corps quotas), the 1,536 TBS students for whom data were available were scored on each of the "best" scales. Also, the 550 TBS students whose preferred MOS was one of the 12 under investigation were examined to determine the percentage scoring high on their own preferred choice MOS scale.

Finally, the Naval Academy graduates who identified one of the MOSs under study as their first choice field at the time of retest (N=118) were used to assess the proportion of high scores obtained on each scale by persons who were satisfied with their MOS.

RESULTS AND DISCUSSION

Scale Development

Thirty-nine of the potential 44 scales included a sufficient number of items differentiating the criterion sample from the reference sample. As shown in Table 4,[2] the five scales with an insufficent number of items were (1) artillery Set 2 (MRS), (2) artillery Set 3 (MIX), (3) tank Set 3 (MIX), (4) communication Set 3 (MIX), and (5) AAW, air support, and air defense Set 3 (MIX). For most scales, the minimum percentage difference was in the range of 16 to 18 percent. However, the minimum was raised to 21 percent for the two samples with fewer than 50 subjects--amphibian vehicle and aviation supply. For most scales, between 50 and 70 items were identified, a sufficient number to expect good scale test-retest reliability.

Scale Evaluation

Scale evaluation was divided into three phases. Phase 1 was designed to determine which scale (based on the four reference samples) best measured the interests of the 11 criterion samples. It was, essentially, a within-MOS evaluation of scales. Phase 2 was a between-MOS scale evaluation of the best scales selected in Phase 1; Phase 3 looked at MOS scale scores for TBS students and Naval Academy graduates to determine the percentages scoring high. These phases are described below.

Phase 1

In Phase 1, the test-retest reliability data and Tilton's overlap percentages were used to select the best scale to represent each MOS. The goal was to choose scales that had a good balance between test-retest reliability and power to differentiate the criterion MOS from the GRS (men in general) and the MRS (marines in general). For every MOS, the Set 1 (GRS) scale best differentiated the criterion sample from the GRS. However, in no

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[1] One sample was a combination of those with AAW, air support, and air defense MOSs.

[2] Because of the large number of tables in this section relative to the amount of text, the tables appear at the end of the section, commencing on page 12.

instance did the Set 1 (GRS) scale best differentiate the criterion sample from the MRS. Since the purpose of the scales will be to differentiate among interests of marines, the power of the scales to differentiate among MOSs is also important; in some instances, the Set 4 (GRS) scales were most able to differentiate the MOSs. A discussion of the reliability and validity data that contributed to the choice of the best scale for each MOS is given below. The test-retest reliability coefficients for the 39 scales are presented in Table 5; and the Tilton's overlap percentages, in Tables 6 and 7.

Set 4 (TBS) Scales. In most instances, the Set 4 (TBS) scales had the lowest reliabilities and also the least differentiating power. As shown in Table 5, for 7 of the 11 MOS criterion samples, the Set 4 (TBS) scales were least reliable, with coefficients in the mid to low .70s over 3 years (Test-retest Sample 3), compared to test-retest correlations in the .80s to .90s range for scales in Sets 1, 2, and 3, which were constructed with the GRS, MRS, or MIX reference samples. Also, as shown in Table 6, the Set 4 (TBS) scales were consistently the least valid with overlap percentages frequently in the 70s and 80s, and almost always higher than the overlap percentages for the other scales within any given MOS.

Sets 1, 2, and 3 (GRS, MRS, and MIX) Scales.

1. AAW, air support, and air defense and tank. Only two scales in Sets 1, 2, and 3 had 3-year reliability coefficients below .77 (Table 5): (1) AAW, air support, and air defense Set 2 (MRS), with only 16 items, and (2) tank Set 2 (MRS), with only 27 items. A comparison of the validity data for the Set 1 (GRS) and Set 2 (MRS) scales for the AAW, air support, and air defense and the tank MOSs showed that, for the former, the Set 2 scale was more valid than was the Set 1 scale; for the latter, the Set 1 scale had slightly more differentiating power than did the Set 2 scale. Thus, the lower reliability, high validity Set 2 scale was chosen to represent the AAW, air support, and air defense MOS; and the higher reliability, greater validity Set 1 scale was chosen to represent the tank MOS.

For the remaining nine MOSs, the Set 1, 2, and 3 scales were all sufficiently reliable to be selected without hesitation; the 3-year test-retest correlations in the high .70s and .80s compared favorably with the SCII occupational scales, which had a median 3-year test-retest correlation of .85 (Campbell, 1977). Thus, the validity data in Tables 6 and 7 were used to select the best scales for the remaining MOSs.

2. Infantry and Amphibian Vehicle MOSs. For the infantry and amphibian vehicle MOSs, the Set 1 and Set 2 scales were equally valid. For both MOSs, the Set 1 scales best differentiated the criterion samples from men in general (GRS) and other MOSs such as communication, ground supply, aviation supply, and data systems. The Set 2 scales best differentiated the criterion samples from marines in general (MRS) and other MOSs such as artillery, engineer, and tank.

The infantry Set 1 scale was substantially longer (N=66 items) than was the Set 2 scale (N=23 items) but only moderately more reliable (.89 compared to .84). Although the infantry Set 1 scale appeared slightly more useful than did the Set 2 scale, both were retained for analysis in Phase 2 of the evaluation.

The amphibian vehicle Set 1 scale also was substantially longer (N=51 items) than was the Set 2 scale (N=28 items). Although the Set 2 scale was consistently more reliable over 2-week, 30-day, and 3-year intervals, both scales were retained for analysis in Phase 2.

3. Communication and Engineer MOSs. No Set 3 scale was constructed for the communications MOS. The reliability of the two other sets of communication scales were comparable; however, since the Set 2 scale was better able to differentiate the communication criterion sample from the other MOSs, it was retained for Phase 2. Although the Set 1 scale for the engineer MOS was slightly more reliable than the Set 3 scale, the latter was superior in differentiating the engineer MOS from other MOSs. Thus, the Set 3 scale was retained for Phase 2.

4. Artillery. Since an insufficient number of items differentiated the artillery criterion sample from the MRS or MIX reference samples, only Set 1 and Set 4 scales were constructed. The Set 1 scale was retained for Phase 2 because it was more reliable and more valid than the Set 4 scale.

5. Ground Supply, Aviation Supply, Ground and Aviation Supply, and Data Systems. Since Set 3 scales were the most valid for the ground supply, aviation supply, ground and aviation supply, and data systems samples, they were retained for Phase 2.

Naval Academy Test-Retest. The Naval Academy test-retest sample was collected to assist in Phase 1 analyses. However, since sample members completed different forms of the Strong for collection of Time 1 and Time 2 data, it was impossible to compute reliability coefficients directly for the SCII-MOS scales. Shortened scales were developed to ensure that all subjects had responded to all of the items on the scales. The data in Table 8 indicate that correlations between the SCII-MOS scales and the shortened scales developed to accommodate the Time 1 item response data of the Naval Academy graduates were, in many instances, extremely low. Thus, the usefulness of generalizing from the test-retest coefficients on the shortened scales to conclusions about the reliability of the longer scales or about the stability of the interests of the Naval Academy graduates as measured by the longer scales is questionable.

Phase 2

Once the best scale(s) was selected for each MOS, the mean scores for the 10 MOS samples and the CIMR samples of Army, Air Force and Navy officers and 60 civilian occupations (a total of 73 samples) were calculated for each (see Appendix B). Results showed that the best scales were those (1) that spread the occupations over a wide range of scores, (2) whose scale's criterion sample had a score similar to, or clustered with, occupations in the same interest area, and (3) that differentiated the scale's MOS criterion sample from the other MOSs by at least 1/2 standard deviation (SD) (a statistically, as well as psychologically, significant difference).

The mean scores for the samples on the 13 selected scales ranged from a high of 4.2 SDs (tank Set 1 (GRS)) to a low of 1.9 SDs (communication Set 2 (MRS)). The scales developed using the GRS reference sample had greater ranges of scores than did the scales developed using the MRS or MIX reference samples. Typically, the range of scores for the Set 1 scales was almost 4 SDs; and for the Set 2 and Set 3 scales, about 2-1/2 SDs.

The MOS scales constructed with the GRS reference sample compared favorably to other SCII occupational scales, which also spread occupations over 3 to 4 standard deviations. Although not as impressive, the distributions of occupations for the other MOS scales were suffficiently large to warrant confidence in the scales.

On all but four scales, the criterion sample--with standardized mean set equal to 50--had the highest score on its own scale. In no instance did another MOS sample or military branch sample outscore the criterion MOS on its own scale. For scales with

occupational samples scoring higher than the criterion MOS, the clustering was logical. For example, physicists and chemists scored one point higher than did the criterion sample on the communication Set 2 scale; business education teachers (54) and department store managers (51) scored higher than did the criterion sample on the ground supply Set 3 scale.

For most scales, the high scoring occupations made sense; the high scoring samples on the infantry Set 2 (MRS) scale included occupations that emphasize leadership and management--Chamber of Commerce executives, public relations directors, elected public officials, public administrators, life insurance sales agents, and YMCA directors. Also, the high scoring samples on the engineer Set 3 (MIX) scale included engineers, farmers, foresters, and agribusiness managers; the high scoring samples on the data systems Set 3 (MIX) scale included physicists, chemists, engineers, systems analysts, and computer programmers.

Set 1 scales, developed using the GRS reference sample, clustered primarily with the other MOS samples. However, within this group, only the artillery Set 1 scale did not differentiate between its own criterion group and the other MOS samples by at least 1/2 SD.

The amphibian Set 2 (MRS) scale was the only one with a puzzling cluster of high scoring samples. The high scoring samples included occupations with artistic interests such as fine artists, art instructors, commercial artists, and occupational therapists.

Infantry was the highest scoring MOS sample on the amphibian Set 1 and Set 2 scales, and the overall distribution of occupational samples on the Set 1 scale appeared more reasonable than did the distribution for the Set 2 scale. Given the small number of items on the Set 2 scale, the small size of the criterion sample, and these results, it appears that the amphibian Set 2 scale should be studied more carefully. The Set 1 scale appears to be the more useful of the two.

For the most part, the scales differentiated the criterion sample from the majority of the other MOSs by 1/2 SD. The artillery Set 1 scale, as mentioned before, was the major exception--five of the 10 MOSs scored 45 or higher on the scale. The data system MOS scored 49 on the communication Set 2 scale; and the ground supply MOS scored 48 on the AAW, air support, and air defense Set 2 scale. The artillery and tank MOSs both scored 46 on the infantry Set 1 scale but only 44 and 43 respectively on the Infantry Set 2 scale.

Phase 3

Table 9 presents the range of scores, means, and standard deviations for 1,536 TBS students on each of the 13 scales selected. Low mean scores indicated good separation between a general military sample like the TBS and the MOS samples. If the mean scores are in the 40s, indicating little separation, the percentage of people scoring high will be inordinately large. Five of the 13 scales had mean scores of 40 or more--the infantry Sets 1 and 2, artillery Set 1, tank Set 1, and AAW, air support, and air defense Set 2. These are the same scales that had the least power to differentiate among occupational samples as well as between MOS samples. The range of scores for the TBS students for all scales was large. The percentage of TBS scoring high on each scale is provided in Table 9 to allow the Marine Corps to compare the results with their quotas.

The data in Table 10 give the percentage of the TBS students whose first MOS preference was one of the 12 designated for this study who scored high on their preferred MOS scale. The hit rate for scores of 45 or higher was 44 percent or greater for 11 of the

12 MOS groups. For most of the scales, the hit rate was in the 50 to 60 percent range, which compares favorably with the hit rate for students-in-general scored on the SCII occupational scales (Spokane, 1979). The lowest hit rates were for TBS students whose preferred MOS was (1) data systems--42.3 percent on data systems Set 3 scale; (2) air defense--27.3 percent on the AAW, air support, and air defense Set 2 scale, (3) aviation supply--29.2 percent on the aviation supply Set 3 scale but 66.7 percent on the ground and aviation supply Set 3 scale, and (4) amphibian vehicle--38.5 percent on the amphibian vehicle Set 1 scale. Sixty-seven percent of each MOS criterion sample scored 45 or higher on their own scale and 84 percent scored 40 or higher.

Table 11 gives the hit rates for the 118 retested Naval Academy graduates who indicated one of the 12 MOSs as their first choice field. Because of the small sample sizes for each MOS, the data are not especially informative. The hit rate for the largest sample--infantry (N=38)--was an impressive 81.6 percent for scores of 45 or greater on the infantry Set 1 scale and 71.1 percent for scores of 45 or greater on the infantry Set 2 scale.

Table 4

Scale Characteristics

Scale	Set	No. of Items	Percent Difference
Infantry	1 (GRS)	66	17
	2 (MRS)	23	16
	3 (MIX)	26	16
	4 (TBS)	36	16
Artillery	1 (GRS)	58	17
	2 (MRS)[a]	7	16
	3 (MIX)[a]	1	16
	4 (TBS)	52	16
Engineer	1 (GRS)	64	20
	2 (MRS)	24	16
	3 (MIX)	22	16
	4 (TBS)	61	21
Tank	1 (GRS)	56	18
	2 (MRS)	27	16
	3 (MIX)[a]	4	16
	4 (TBS)	49	16
Amphibian vehicle	1 (GRS)	51	24
	2 (MRS)	28	21
	3 (MIX)	42	21
	4 (TBS)	56	21
Communication	1 (GRS)	46	16
	2 (MRS)	15	16
	3 (MIX)[a]	4	16
	4 (TBS)	55	18
Ground supply	1 (GRS)	68	18
	2 (MRS)	58	16
	3 (MIX)	48	16
	4 (TBS)	57	19
Aviation supply	1 (GRS)	59	24
	2 (MRS)	55	24
	3 (MIX)	57	22
	4 (TBS)	56	22
Ground aviation supply	1 (GRS)	66	18
	2 (MRS)	56	16
	3 (MIX)	47	16
	4 (TBS)	59	18
Data systems	1 (GRS)	63	17
	2 (MRS)	47	16
	3 (MIX)	53	16
	4 (TBS)	65	23
AAW, air support, and air defense	1 (GRS)	54	18
	2 (MRS)	16	16
	3 (MIX)[a]	5	16
	4 (TBS)	61	16

[a]Insufficient number of items at minimum (16%) percent difference; no scale constructed.

Table 5

Statistics for Test-Retest Sample Scores on the SCII-MOS Scales

Scale/Set	Sample 1 (2 weeks) (N = 74 Men)					Sample 2 (30 days) (N = 67 Men)					Sample 3 (3 years) (N = 75 Men)				
	Test-Retest	Test		Retest		Test-Retest	Test		Retest		Test-Retest	Test		Retest	
	Correlation	Mean	S.D.	Mean	S.D.	Correlation	Mean	S.D.	Mean	S.D.	Correlation	Mean	S.D.	Mean	S.D.
Infantry															
1 (GRS)	.87	22.2	10.68	22.7	10.78	.84	27.8	10.30	28.3	11.05	.89	25.2	13.24	25.0	13.30
2 (MRS)	.85	30.1	8.53	29.4	8.92	.86	37.7	9.63	37.7	10.47	.84	33.8	10.58	33.4	11.56
3 (MIX)	.87	43.7	8.67	42.2	9.41	.90	46.7	9.38	46.0	10.16	.85	41.6	9.45	42.3	10.06
4 (TBS)	.80	42.7	9.24	41.5	10.10	.81	45.4	9.01	43.9	10.25	.72	46.1	8.28	47.1	8.78
Artillery															
1 (GRS)	.82	22.6	11.31	22.9	10.68	.82	26.5	11.75	26.8	12.26	.86	26.2	13.31	25.9	13.97
2 (MRS)[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3 (MIX)[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4 (TBS)	.86	41.3	9.77	40.8	10.84	.85	42.3	9.38	41.5	10.59	.78	47.0	10.74	48.8	10.90
Engineer															
1 (GRS)	.92	23.0	11.98	24.0	12.30	.90	20.9	12.29	22.6	12.22	.83	25.3	13.51	25.5	12.90
2 (MRS)	.92	27.2	13.34	28.4	14.87	.86	27.4	12.52	30.1	12.71	.78	32.0	13.37	31.8	13.25
3 (MIX)	.88	30.8	12.13	32.6	13.22	.83	28.6	10.92	30.9	10.78	.78	33.3	12.38	32.9	11.73
4 (TBS)	.93	37.5	9.71	36.9	11.00	.87	33.5	9.28	33.8	9.37	.85	39.9	11.59	41.3	11.54
Tank															
1 (GRS)	.85	17.4	13.50	20.2	13.83	.83	18.9	13.81	21.4	14.14	.80	20.7	14.35	19.8	14.53
2 (MRS)	.79	26.9	10.94	29.6	11.72	.84	31.9	11.17	35.0	12.77	.62	32.1	10.56	31.7	11.92
3 (MIX)[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4 (TBS)	.88	36.5	11.36	38.2	11.49	.81	36.3	10.18	37.0	10.79	.79	44.1	11.00	45.9	12.14
Amphibian															
1 (GRS)	.84	25.3	11.90	24.3	12.48	.80	22.1	9.53	23.2	10.05	.81	19.1	11.62	19.2	12.97
2 (MRS)	.88	37.7	11.49	36.5	11.96	.87	35.0	12.51	35.4	12.39	.82	29.5	11.04	29.5	12.13
3 (MIX)	.88	41.9	8.83	39.9	10.20	.85	39.5	9.95	39.1	10.08	.80	35.1	9.36	35.9	10.04
4 (TBS)	.87	40.7	11.40	39.1	13.05	.86	36.5	10.20	34.9	13.07	.71	38.0	10.80	39.2	11.31
Communications															
1 (GRS)	.85	19.1	13.60	20.7	13.53	.83	23.4	15.76	26.2	16.31	.80	25.6	14.46	25.3	14.81
2 (MRS)	.85	35.9	11.83	37.1	13.16	.84	35.7	13.14	37.9	14.64	.83	42.7	12.31	41.5	12.42
3 (MIX)[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4 (TBS)	.89	43.0	9.23	42.8	10.43	.83	41.7	9.01	41.4	9.71	.87	48.4	11.32	50.2	12.03
Ground supply															
1 (GRS)	.94	26.1	11.62	27.0	11.87	.86	32.5	11.39	33.1	11.47	.83	31.0	11.73	31.0	12.01
2 (MRS)	.92	32.7	10.23	32.7	10.67	.88	39.7	10.01	40.0	10.27	.88	37.5	10.51	37.8	11.32
3 (MIX)	.92	33.8	10.24	32.8	10.53	.89	40.0	10.28	39.4	10.14	.90	36.8	11.17	37.8	11.40
4 (TBS)	.92	32.4	10.90	32.7	11.23	.82	37.0	9.55	35.9	8.85	.76	39.5	8.03	40.9	9.25

[a]No scale constructed

Table 5 (Continued)

Scale/Set	Sample 1 (2 weeks) (N = 74 Men)					Sample 2 (30 days) (N = 67 Men)					Sample 3 (3 years) (N = 75 Men)				
	Test-Retest Correlation	Test Mean	Test S.D.	Retest Mean	Retest S.D.	Test-Retest Correlation	Test Mean	Test S.D.	Retest Mean	Retest S.D.	Test-Retest Correlation	Test Mean	Test S.D.	Retest Mean	Retest S.D.
Aviation supply															
1 (GRS)	.90	20.8	11.97	22.9	13.67	.88	30.5	12.49	32.1	13.53	.81	28.0	13.12	27.8	14.03
2 (MRS)	.89	30.3	10.18	31.9	10.99	.87	39.1	10.60	39.4	11.67	.79	36.5	10.56	36.0	11.48
3 (MIX)	.88	29.7	10.05	32.2	11.51	.87	38.9	10.78	39.6	12.28	.77	36.5	11.17	35.4	12.19
4 (TBS)	.87	27.6	11.54	29.3	12.81	.81	36.0	10.30	36.6	10.75	.70	36.7	9.74	37.7	11.36
Ground and aviation supply															
1 (GRS)	.94	26.8	11.48	28.0	11.92	.86	33.9	11.27	34.6	11.60	.82	32.6	11.48	32.5	11.91
2 (MRS)	.91	33.2	10.23	33.8	10.82	.88	40.4	9.97	40.9	10.42	.84	38.8	9.63	38.9	10.48
3 (MIX)	.92	33.7	10.21	33.7	10.58	.89	41.3	10.75	41.0	10.37	.89	38.3	11.66	38.8	11.79
4 (TBS)	.91	33.4	10.48	34.3	10.92	.85	39.6	9.34	38.6	9.20	.75	41.3	8.21	42.2	9.54
Data systems															
1 (GRS)	.89	24.9	10.74	26.9	11.6	.90	24.3	13.87	25.9	13.55	.87	31.8	12.47	32.3	12.54
2 (MRS)	.90	30.0	11.80	31.8	12.86	.89	31.4	13.02	32.5	13.41	.88	38.3	14.59	38.3	14.40
3 (MIX)	.86	35.7	11.18	36.5	11.59	.89	33.2	11.95	32.9	12.37	.91	40.6	14.92	41.1	14.75
4 (TBS)	.90	32.3	11.79	33.6	12.17	.87	32.4	11.87	31.6	12.59	.86	40.2	14.47	41.6	15.13
AAW, air support, and air defense															
1 (GRS)	.86	27.0	11.17	26.8	11.05	.88	28.2	12.50	28.2	11.59	.86	28.8	13.30	28.4	14.02
2 (MRS)	.74	39.2	11.43	38.5	11.55	.69	41.9	11.17	42.3	10.28	.72	37.7	11.07	38.1	11.27
3 (MIX)[a]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4 (TBS)	.90	44.3	9.03	44.0	9.39	.87	42.2	9.10	41.5	10.01	.86	46.9	9.55	48.4	9.58

[a]No scale constructed

Table 6

Tilton's Overlap Percentages for MOS Scales Using Criterion Samples Versus General Reference Sample (GRS) and Marine Reference Sample (MRS)

Scale/Set	GRS Mean	GRS S.D.	GRS Percent Overlap	MRS Mean	MRS S.D.	MRS Percent Overlap
Infantry						
1 (GRS)	24.2	12.63	25	39.2	12.04	62
2 (MRS)	34.1	10.31	43	37.5	11.83	57
3 (MIX)	43.2	8.92	72	43.6	9.49	74
4 (TBS)	45.7	9.48	83	46.3	9.93	85
Artillery						
1 (GRS)	23.9	12.77	25	41.8	11.63	70
2 (MRS)[a]	--	--	--	--	--	--
3 (MIX)[a]	--	--	--	--	--	--
4 (TBS)	44.9	11.58	81	46.5	10.90	87
Engineer						
1 (GRS)	24.0	13.94	28	38.3	11.48	59
2 (MRS)	31.1	13.39	42	36.9	12.24	55
3 (MIX)	33.2	12.15	45	37.2	11.52	55
4 (TBS)	38.6	11.60	60	40.7	11.03	66
Tank						
1 (GRS)	19.1	14.63	21	37.5	13.00	59
2 (MRS)	32.1	11.69	41	36.2	13.11	55
3 (MIX)[a]	--	--	--	--	--	--
4 (TBS)	41.5	11.88	70	43.4	10.78	75
Amphibian vehicle						
1 (GRS)	19.2	11.74	16	31.9	11.96	41
2 (MRS)	32.8	11.92	43	33.1	12.14	45
3 (MIX)	37.6	9.81	53	37.6	10.40	54
4 (TBS)	38.3	11.68	59	38.1	12.25	59
Communication						
1 (GRS)	23.0	15.30	29	41.2	13.23	71
2 (MRS)	40.4	12.70	67	37.1	12.44	57
3 (MIX)[a]	--	--	--	--	--	--
4 (TBS)	46.5	10.92	87	43.3	10.72	75
Ground supply						
1 (GRS)	30.7	13.06	40	38.6	10.96	59
2 (MRS)	37.9	11.11	57	36.0	10.55	50
3 (MIX)	37.9	11.13	57	35.2	10.32	47
4 (TBS)	38.8	11.52	60	36.7	10.34	51
Aviation supply						
1 (GRS)	27.1	13.95	34	33.8	13.17	49
2 (MRS)	36.3	10.89	51	34.1	11.45	46
3 (MIX)	36.3	11.31	52	32.4	12.23	43
4 (TBS)	36.0	11.70	52	32.1	11.93	41
Ground and aviation supply						
1 (GRS)	32.0	12.71	43	39.2	11.12	61
2 (MRS)	38.8	10.76	59	37.2	10.78	54
3 (MIX)	38.8	11.45	60	35.5	10.51	48
4 (TBS)	40.4	11.16	65	37.4	10.43	54
Data systems						
1 (GRS)	27.6	12.94	33	36.9	12.24	56
2 (MRS)	34.4	13.68	51	32.2	14.07	46
3 (MIX)	37.2	13.38	58	31.9	14.12	45
4 (TBS)	36.6	14.04	58	33.8	14.32	51
AAW, air support, and air defense						
1 (GRS)	27.3	13.46	33	43.1	10.94	74
2 (MRS)	39.9	11.26	64	38.1	10.95	57
3 (MIX)[a]	--	--	--	--	--	--
4 (TBS)	45.5	10.50	83	45.2	9.76	81

[a]No scale constructed

Table 7

Tilton's Overlap Percentages for MOS Scales Using Criterion Samples Versus Other MOS Samples

	MOS Samples										
	Infant.	Art.	Eng.	Tank	Amphib. Vehicle	Comm.	Grd. Sup.	Av. Sup.	Grd/Av. Sup.	Data Sys.	AAW, Air Support, and Air Defense
Infantry											
1 (GRS)	100	83	71	83	74	58	69	69	69	43	69
2 (MRS)	100	77	61	75	68	59	73	73	73	48	65
3 (MIX)	100	80	64	71	91	63	90	80	88	51	72
4 (TBS)	100	94	94	79	95	87	95	78	92	81	84
Artillery											
1 (GRS)	99	100	87	93	72	67	74	66	73	57	80
2 (MRS)[a]	--	--	--	--	--	--	--	--	--	--	--
3 (MIX)[a]	--	--	--	--	--	--	--	--	--	--	--
4 (TBS)	89	100	99	79	76	93	100	80	96	91	90
Engineer											
1 (GRS)	65	71	100	72	61	57	51	45	50	54	55
2 (MRS)	57	66	100	73	52	61	53	59	54	60	55
3 (MIX)	49	58	100	62	51	52	45	47	46	60	46
4 (TBS)	53	63	100	62	59	68	58	48	56	73	58
Tank											
1 (GRS)	77	78	83	100	63	54	58	59	58	47	59
2 (MRS)	70	68	70	100	61	64	63	69	64	55	64
3 (MIX)[a]	--	--	--	--	--	--	--	--	--	--	--
4 (TBS)	64	76	94	100	70	81	72	66	71	89	71
Amphibian vehicle											
1 (GRS)	59	43	49	57	100	35	35	27	34	13	44
2 (MRS)	59	41	43	54	100	38	39	35	38	13	43
3 (MIX)	67	51	49	52	100	45	55	44	52	22	51
4 (TBS)	55	52	65	52	100	57	55	39	52	46	57
Communciation											
1 (GRS)	85	93	93	95	72	100	78	73	77	78	83
2 (MRS)	48	58	65	94	46	100	59	74	62	96	74
3 (MIX)[a]	--	--	--	--	--	--	--	--	--	--	--
4 (TBS)	54	69	86	60	61	100	77	69	75	95	77
Ground supply											
1 (GRS)	76	76	62	73	50	64	100	93	99	62	68
2 (MRS)	61	61	46	56	39	55	100	92	98	61	60
3 (MIX)	55	53	38	46	39	42	100	80	96	49	49
4 (TBS)	48	59	59	49	34	58	100	82	96	72	57
Aviation supply											
1 (GRS)	64	61	46	61	39	53	73	100	78	50	55
2 (MRS)	53	53	39	53	32	53	73	100	79	51	50
3 (MIX)	45	44	32	44	27	45	65	100	72	49	43
4 (TBS)	37	44	35	39	22	46	74	100	79	60	48
Ground and aviation supply											
1 (GRS)	78	79	63	76	51	67	99	99	100	66	71
2 (MRS)	63	66	51	62	41	60	100	99	100	67	64
3 (MIX)	57	55	39	49	34	45	98	93	100	55	53
4 (TBS)	50	61	55	51	33	59	99	95	100	76	59
Data systems											
1 (GRS)	47	63	68	54	32	67	57	57	57	100	63
2 (MRS)	32	47	49	37	18	59	50	61	52	100	54
3 (MIX)	23	37	44	24	19	51	42	50	44	100	46
4 (TBS)	28	45	53	30	30	58	53	51	53	100	52
AAW, air support, and air defense											
1 (GRS)	95	95	88	87	80	73	83	64	79	60	100
2 (MRS)	66	67	62	62	62	66	91	78	88	63	100
3 (MIX)[a]	--	--	--	--	--	--	--	--	--	--	--
4 (TBS)	66	80	89	70	68	88	92	70	87	100	100

[a]No scale constructed.

Table 8

Intercorrelations of Long and Short SCII-MOS Scales and Test-Retest Means, Standard Deviations, and Correlations for Naval Academy Graduates (N = 234)

Scale/ Set	Number of Items: Long Scale	Number of Items: Short Scale	Correlations: Between Long[a] & Short Scales	Correlations: Test-Retest[b]	Mean	S.D.	Mean	S.D.
Infantry								
1 (GRS)	66	58	.57	.29	39.2	8.94	41.0	10.96
2 (MRS)	23	22	.99	.50	38.5	9.37	39.1	10.71
3 (MIX)	26	22	.52	.49	39.2	7.81	42.0	9.59
4 (TBS)	36	32	.98	.46	35.6	8.50	41.1	10.03
Artillery								
1 (GRS)	58	51	.70	.34	40.0	9.31	43.1	11.12
2 (MRS)[c]	--	--	--	--	--	--	--	--
3 (MIX)[c]	--	--	--	--	--	--	--	--
4 (TBS)	52	43	.63	.48	37.2	9.25	43.2	10.72
Engineer								
1 (GRS)	64	57	.75	.48	36.8	11.84	39.6	12.24
2 (MRS)	24	19	.53	.49	38.3	12.45	39.9	12.83
3 (MIX)	22	19	.57	.49	36.2	12.38	38.6	12.57
4 (TBS)	61	52	.44	.52	33.9	9.87	38.6	10.32
Tank								
1 (GRS)	56	52	.71	.39	38.1	12.30	39.7	13.68
2 (MRS)	27	24	.50	.47	42.2	11.87	39.7	12.69
3 (MIX)[c]	--	--	--	--	--	--	--	--
4 (TBS)	49	42	.60	.46	46.0	34.4	11.05	11.39
Amphibian								
1 (GRS)	51	43	.56	.30	28.3	9.88	28.0	11.97
2 (MRS)	28	25	.57	.29	29.2	9.12	29.3	10.82
3 (MIX)	42	35	.51	.39	30.8	9.25	33.2	9.84
4 (TBS)	56	47	.55	.43	30.8	10.10	33.8	11.04
Communications								
1 (GRS)	46	41	.56	.25	43.8	10.99	44.0	13.47
2 (MRS)	15	13	.41	.27	42.7	11.50	41.5	12.56
3 (MIX)[c]	--	--	--	--	--	--	--	--
4 (TBS)	55	47	.57	.42	38.3	9.32	40.6	9.09
Ground supply								
1 (GRS)	68	58	.70	.34	34.9	9.23	39.7	10.97
2 (MRS)	58	50	.44	.45	35.9	9.83	36.7	10.54
3 (MIX)	48	40	.62	.36	29.2	9.29	34.0	10.94
4 (TBS)	57	46	.54	.30	29.7	10.45	33.0	10.26
Aviation supply								
1 (GRS)	59	53	.66	.48	33.6	10.35	36.4	12.09
2 (MRS)	55	42	.51	.53	34.9	9.74	34.9	11.42
3 (MIX)	57	45	.64	.54	33.4	10.26	33.4	11.87
4 (TBS)	56	44	.57	.39	28.0	10.28	31.6	11.59
Ground & aviation supply								
1 (GRS)	66	56	.68	.35	35.7	9.14	40.5	10.99
2 (MRS)	56	38	.36	.44	36.8	9.43	38.0	10.48
3 (MIX)	47	40	.66	.37	31.4	9.30	35.0	11.00
4 (TBS)	59	46	.52	.27	30.8	10.32	34.2	10.56
Data systems								
1 (GRS)	63	52	.55	.35	40.6	10.09	41.6	11.69
2 (MRS)	47	37	.62	.31	39.9	10.10	37.8	11.82
3 (MIX)	53	45	.69	.37	36.9	10.03	35.71	11.35
4 (TBS)	65	51	.68	.46	33.9	10.07	35.8	10.88
AAW, air support, and air defense								
1 (GRS)	54	48	.69	.35	41.1	9.88	43.2	11.59
2 (MRS)	16	14	.35	.31	38.1	11.31	40.2	10.40
3 (MIX)[c]	--	--	--	--	--	--	--	--
4 (TBS)	61	53	.41	.56	37.9	9.41	42.0	9.52

[a]Based on the GRS (300 men).

[b]Based on a retest sample of Naval Academy graduates (N = 234).

[c]No scale constructed.

Table 9

TBS Sample (N = 1,536) Statistics on Each Selected MOS Scale

Selected Scale	% of TBS Scoring = 40	% of TBS Scoring = 45	Range		Mean	Standard Deviation
			Minimum	Maximum		
Infantry						
Set 1 (GRS)	67.0	46.5	8.9	68.2	43.4	9.80
Set 2 (MRS)	56.2	33.9	7.3	70.6	40.9	10.57
Artillery						
Set 1 (GRS)	68.5	51.4	11.6	70.0	44.5	9.92
Engineer						
Set 3 (MIX)	37.0	26.4	6.8	65.6	35.8	12.27
Tank						
Set 1 (GRS)	60.6	44.9	-5.2	69.2	42.0	12.01
Amphibian vehicle						
Set 1 (GRS)	33.7	21.1	-1.8	71.0	34.5	12.23
Set 2 (MRS)	34.1	23.0	7.0	65.5	35.0	12.48
Communication						
Set 2 (MRS)	49.5	35.0	7.8	75.6	39.9	12.76
Ground supply						
Set 3 (MIX)	27.8	17.3	8.5	72.7	33.9	11.16
Aviation supply						
Set 3 (MIX)	32.9	21.1	4.9	68.2	34.6	12.44
Ground & aviation supply						
Set 3 (MIX)	31.7	19.5	9.3	70.3	34.9	11.42
Data systems						
Set 3 (MIX)	20.7	9.8	-4.4	64.8	28.1	12.85
AAW, air support, and air defense						
Set 2 (MRS)	51.9	29.4	6.4	72.3	40.1	11.01

Table 10

Percentage of TBS Sample (N = 550) Who Scored High on Their Preferred MOS Scale

Primary MOS	Number of TBS in MOS	MOS Scale	% Scoring ≥ 45
Infantry	225	Infantry	
		1 (GRS)	64.0
		2 (MRS)	48.0
Artillery	93	Artillery	
		1 (GRS)	63.4
Engineer	38	Engineer	
		3 (MIX)	57.9
Tank	41	Tank	
		1 (GRS)	63.4
Amphibian vehicle	13	Amphibian vehicle	
		1 (GRS)	38.5
		2 (MRS)	53.8
Communication	28	Communication	
		1 (MRS)	64.3
Ground supply	20	Ground supply	
		3 (MIX)	55.0
		Ground and aviation supply	
		3 (MIX)	55.0
Aviation supply	24	Aviation supply	
		3 (MIX)	29.2
		Ground and aviation supply	
		3 (MIX)	66.7
Data systems	26	Data systems	
		3 (MIX)	42.3
AAW	22	AAW, air support, and air defense	
		2 (MRS)	45.5
Air support	9	AAW, air support, and air defense	
		2 (MRS)	44.4
Air defense	11	AAW, air support, and air defense	
		2 (MRS)	27.3

Table 11

Percentage of Navy Academy Graduates (N = 118) Who Scored High on Selected MOS Scales

Primary MOS	Number of Ss in MOS	MOS Scale	% Scoring ≥ 45
Infantry	38	Infantry	
		1 (GRS)	81.6
		2 (MRS)	71.1
Artillery	16	Artillery	
		1 (GRS)	56.3
Engineer	11	Engineer	
		3 (MIX)	72.7
Tank	6	Tank	
		1 (GRS)	16.7
Amphibian vehicle	1	Amphibian vehicle	
		1 (GRS)	0.0
		2 (MRS)	0.0
Communication	2	Communication	
		2 (MRS)	50.0
Ground supply	5	Ground supply	
		3 (MIX)	40.0
		Ground & aviation supply	
		3 (MIX)	20.0
Aviation supply	5	Aviation supply	
		3 (MIX)	20.0
		Ground & aviation supply	
		3 (MIX)	20.0
Data systems	17	Data systems	
		3 (MIX)	35.3
AAW	3	AAW, air support, and air defense	
		2 (MRS)	0.0
Air support	10	AAW, air support, and air defense	
		2 (MRS)	0.0
Air defense	4	AAW, air support, and air defense	
		2 (MRS)	0.0

CONCLUSIONS

Useful scales probably could be constructed for every MOS except infantry and artillery if sufficient samples could be obtained. The best scales in this study represented the MOSs with sample sizes of at least 75 subjects.

Analysis of the reliability and validity data for the 39 experimental MOS scales indicated that the following three scales, which were constructed for 3 of the 12 MOS, met all of the various criteria for useful scales: (1) engineer Set 3 (MIX), (2) ground supply Set 3 (MIX), and (3) data systems Set 3 (MIX).

These three scales were developed using a criterion sample of sufficient size to ensure item response reliability (N=105), using a response percentage difference cut-off of 16 percent or greater to ensure concurrent validity, and including enough items to expect test-retest reliability.

For each scale:

1. The test-retest reliability over a 3-year period ws at least .78.
2. The range of mean scores for occupational samples was at least 2-1/2 SDs.
3. The range of TBS student scores was large (at least 59 points).
4. The mean score for TBS students on each scale was below 40.
5. The hit rate (standard score $\geq$ 45) for TBS students for their preferred MOS was at least 42 percent.

Four of the remaining ten scales appeared useful in spite of sample or scale length shortcomings.

1. Aviation Supply Set 3 (MIX). Since this scale was developed using a criterion sample of only 35 Ss, the reliability of the items selected for the scale may be insufficient. An attempt was made to counterbalance the small sample size by increasing the cut-off percentage to 22. Although the test-retest reliability and power of the scale to differentiate among MOSs compared favorably with the previous four scales, the TBS hit rate was only 29 percent and only 21 percent of the total TBS sample scored 45 or higher on the scale.

2. Amphibian vehicle Set 1 (GRS) and Set 2 (MRS). These scales also were constructed with a small criterion sample (N=27). Although the Set 2 scale has only 28 items compared to 51 items on Set 1, the 3-year test-retest correlations are the same. The Set 2 scale did have a higher hit rate (54%) than did Set 1 (39%), but the Set 2 scale has an unusual configuration of artist occupations scoring high on the scale.

3. Ground and Aviation Supply Set 3 (MIX). This scale was constructed as an alternative to the aviation supply Set 3 (MIX) scale. Generally, the scale did not discriminate among MOSs as well as the aviation supply Set 3 scale did. However, the hit rate for the aviation supply TBS students was 68 percent on this scale, compared to only 29 percent for the aviation supply scale. About 20 percent of the total TBS sample scored high on both scales. The hit rate for the ground supply TBS students on the ground supply Set 3 (MIX) scale was the same as their hit rate on this scale (55%). The data indicated that the ground supply Set 3 scale was superior to this scale for identifying officers with ground supply interests.

The final six scales all have high overlap percentages between the MOS criterion samples and the other MOS samples. The tendency, therefore, may be for an inordinately

large number of officers to score high on the scales. However, the percentage of the total sample of TBS students scoring high on these scales ranges from 29 percent on the AAW, air support, and air defense Set 2 (MRS) scale to 51 percent on the artillery Set 1 (GRS) scale.

1. Communication Set 2 (MRS). Although this scale is very short (15 items), the 3-year test-retest reliability still is nigh (.83). It appears that this scale best differentiates the communication MOS from other MOSs such as infantry, amphibian vehicle, tank, and artillery. It does not differentiate the criterion MOS as well from data systems, aviation supply, and engineer MOSs. This scale probably will be useful for differentiating between two clusters of MOSs but not for clear-cut identification of only the criterion MOSs.

2. Tank Set 2 (GRS). This scale does not differentiate very well between the criterion MOS and the infantry, artillery, engineer, tank, or amphibian vehicle MOSs. However, it does identify differences between the criterion and the communication, ground supply, aviation supply, data systems, AAW, air support, and air defense MOSs. Like the communication scale, this scale will be most useful for differentiating two clusters of MOSs.

3. Infantry Set 1 (GRS) and Set 2 (MRS), artillery Set 1 (GRS), and AAW, air support, and air defense Set 2 (MRS). These scales are the least effective in differentiating the criterion MOS from the other MOSs. The overlap and mean score data suggest that most Marine Corps officers, regardless of their preferred MOS, will score 40 or higher on at least one of these scales. The AAW, air support, and air defense scale probably was not effective because of (a) the heterogeneous nature of the criterion sample, which combined three MOS groups, (b) the criterion small sample size (N=59), and (c) the limited number of items on the scale (N=16).

RECOMMENDATIONS

Before scales are considered for operational use, the following steps must be accomplished:

1. For those scales developed with small sample sizes (aviation supply, amphibian vehicle, AAW, air support, and air defense) or samples of minimal size (tank, communication), larger samples should be collected and the scale construction repeated. One possibility is to collect data for the criterion samples over a number of years. In lieu of reconstructing the scales, cross-validation is essential to assess the reliability of the scale items, and predictive validity studies should be implemented. None of the samples collected for this study was large enough to provide both criterion and cross-validation samples.

2. Predictive validity studies should be conducted for all of the potentially useful scales. Such studies may be difficult to implement since all results will be confounded by the restricted freedom of job choice within the Marine Corps. The identification of subjects who have had the opportunity to select primary and billet MOSs for each criterion sample for a predictive validity study possibly would be even more difficult than identifying subjects for the criterion samples in this project.

3. The scales for the infantry and artillery MOSs did not appear to contribute anything to the identification of the criterion samples' interests and probably should be discarded.

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APPENDIX A

INSTRUCTIONS AND MOS QUESTIONNAIRE

UNIVERSITY OF Minnesota

OFFICE OF THE DEAN OF STUDENTS · STUDENT COUNSELING BUREAU
CENTER FOR INTEREST MEASUREMENT RESEARCH
MINNEAPOLIS, MINNESOTA 55455

Officer Classification System Project
Instructions for Completion of Survey

1) It is well known that the process of assigning TBS students to their initial Military Occupational Specialties (MOS's) must be primarily determined by the quota needs of the Marine Corps. However, it also is true that even within the quota requirements, the appropriateness of the assignments and the job satisfaction of the officers involved could be improved by taking into account the unique aptitudes and interests of each individual.

2) Accordingly, the Commandant of the Marine Corps has tasked the Navy Personnel Research and Development Center (NPRDC) to develop means of giving greater weight to measures of individual aptitudes and vocational interests when the initial MOS assignments are made.

3) As part of this effort, the University of Minnesota's Center for Interest Measurement Research (CIMR) has been contracted to develop objective measures of vocational interests based on the Strong-Campbell Interest Inventory (SCII), and specifically designed for Marine Corps occupations. Scales based on the SCII (a widely used vocational guidance instrument) and developed by CIMR, NPRDC, and others for many civilian and military occupations, today are important tools in vocational guidance applications. By analyzing interest inventories and satisfaction questionnaires that will be completed by over 6000 Marine Corps officers, similar scales will be constructed for a variety of Marine Corps jobs.

4) Your input as an experienced officer is needed for the development of the scales. You are asked to complete the attached materials (questionnaire and SCII) and to return them in the original envelope -- sealed to ensure confidentiality -- to your Commanding Officer, who will mail them to CIMR. At CIMR, your responses will be merged with those of the other participants and only group data will be analyzed. No individual results will be calculated or made available to HQMC. Nothing from the study will appear on your personnel record.

5) If you have any questions, please contact your Commanding Officer. Your assistance in this project is greatly appreciated.

J. C. Hansen
Director, Center for Interest
Measurement Research

131197

UNIVERSITY OF *Minnesota*

Center for Interest Measurement Research

MARINE CORPS OFFICERS MOS QUESTIONNAIRE

The purpose of this questionnaire is to identify the types of work in the military that you think best represent your vocational interests. The essential information needed in this study is a rank ordering of the two fields that reflect your area of interest and an indication of amount of training and work experience that you have had in each.

1) Assuming that you had an opportunity to start over and that opportunities for advancement were equal in all the specialties, assign a "1" to the field that is most compatible with your area of vocational interest and assign a "2" to the second most compatible field.

_____Personnel and Administration
_____Intelligence
_____Infantry
_____Logistics
_____Field Artillery
_____Engineer
_____Tank
_____Amphibian Vehicle
_____Communication
_____Signals Intelligence/Electronics Warfare
_____Ground Supply
_____Aviation Supply
_____Finance
_____Disbursing
_____Motor Transport
_____Data Systems
_____Public Affairs
_____Military Police
_____Aircraft Maintenance
_____Anti-Air Warfare
_____Air Support
_____Air Defense
_____Other (specify)_____

2) Refer back to your first and second choices in Item 1 to complete the following questions:

Have you had work experience (civilian or military) in work corresponding to the area of: a) your first choice:_____yes _____no
Indicate the length of experience: _____years
_____months

b) your second choice:_____yes _____no
Indicate the length of experience: _____years
_____months

Have you had school training other than TBS (military or civilian) in the area of:
a) your first choice:_____yes _____no
Indicate length of training:_____years
_____months

b) your second choice:_____yes _____no
Indicate length of training:_____years
_____months

3) Indicate your career goal: _____command _____staff

4) Present rank:_____

5) Age:_____

6) Educational Level:
_____High School Diploma or Equivalent
_____Some College
_____College Degree
_____Graduate Work

7) How long have you been on active duty (in years and months):_____

APPENDIX B

MEAN SCORES FOR 73 OCCUPATIONAL SAMPLES ON THE 13 BEST MOS SCALES

Table B-1

Mean Scores on the Infantry - Set 1 (GRS)

Mean Score	Occupational Sample
50	MARINE OFFICERS-INFANTRY
49	
48	
47	
46	MARINE OFFICERS-TANK/MARINE OFFICERS-ARTILLERY
45	
44	
43	MARINE OFFICERS-AMPHIBIAN
42	MARINE OFFICERS-ENGINEER/MARINE OFFICERS-GROUND SUPPLY/MARINE OFFICERS-AVIATION SUPPLY/MARINE OFFICERS-AIR SUPPORT-DEFENSE-ANTI-AIR WARFARE
41	
40	
39	Army Officers/MARINE OFFICERS-COMMUNICATION/Naval Officers
38	Life Insurance Sales/Peace Officers/Recreation Leaders
37	
36	Elected Public Officials/Personnel Administrators/Chamber of Commerce Executives/YMCA Directors/Air Force Officers
35	School Administrators/Physical Education Teachers
34	Purchasing Agents/MARINE OFFICERS-DATA SYSTEMS
33	Public Administrators/
32	Nursing Home Administrators/Executive Housekeepers/Food Service Managers
31	Credit Managers/Public Relations Directors/Department Store Managers/Lawyers
30	Accountants/Marketing Executives
29	Physical Therapists/IRS Agents/Dietitians
28	Foresters/Funeral Directors
27	Agribusiness Managers/Special Education Teachers/Nurses, R.N./ Social Workers
26	Business Education Teachers/Flight Attendants/Veterinarians
25	Pharmacists/Optometrists/Reporters/Occupational Therapists/ Elementary Education Teachers
24	Speech Pathologists/Geographers/Systems Analysts
23	Photographers/Farmers/Radiologic Technologists
22	Engineers/Nurses, LPN/Geologists
21	Librarians/Sociologists/Language Teachers
20	Cosmetologists
19	Computer Programmers/Biologists/Architects
18	Chemists
17	Physicists/Commercial Artists/Art Instructors/Musicians
16	
15	
14	Fine Artists

Table B-2

Mean Scores on the Infantry--Set 2 (MRS)

Mean Score	Occupational Sample
50	MARINE OFFICERS-INFANTRY
49	
48	
47	
46	Chamber of Commerce Executives
45	Public Relations Directors/Elected Public Officials
44	Life Insurance Sales/MARINE OFFICERS-ARTILLERY/YMCA Directors/ Public Administrators
43	MARINE OFFICERS-GROUND SUPPLY/MARINE OFFICERS-TANK/MARINE OFFICERS-AVIATION SUPPLY/Personnel Administrators
42	School Administrators/Recreation Leaders/Army Officers
41	Social Workers/MARINE OFFICERS-AMPHIBIAN
40	MARINE OFFICERS-AIR SUPPORT-DEFENSE-ANTI-AIR WARFARE/Nursing Home Administrators/Lawyers/MARINE OFFICERS-ENGINEERS/ Marketing Executives
39	MARINE OFFICERS-COMMUNICATIONS/Department Store Managers/Purchasing Agents
38	Executive Housekeepers/Speech Pathologists/Dietitians/Navy Officers/ Sociologists/Art Instructors/Food Service Managers
37	Reporters/Air Force Officers/Accountants/Peace Officers
36	Geographers/Librarians/Flight Attendants/Language Teachers/Credit Managers/Business Education Teachers/MARINE OFFICERS-DATA SYSTEMS/ Physical Education Teachers/Special Education Teachers
35	Occupational Therapists/IRS Agents/Nurses, R.N.
34	Cosmetologists/Funeral Directors
33	Fine Artists/Biologists/Physical Therapists/Foresters/Photographers/ Commercial Artists/Musicians/Nurses, LPN
32	Elementary Education Teachers/Optometrists
31	Architects/Geologists/Agribusiness Managers/Pharmacists
30	Veterinarians/Chemists
29	Engineers/Radiologic Technologists/Physicists
28	
27	
26	Computer Programmers
25	Farmers

Table B-3

Mean Scores on the Artillery--Set 1 (GRS) Scale

Mean Score	Occupational Sample
50	MARINE OFFICERS-ARTILLERY
49	MARINE OFFICERS-INFANTRY
48	MARINE OFFICERS-TANK
47	MARINE OFFICERS-ENGINEER
46	
45	MARINE OFFICERS-AIR SUPPORT-DEFENSE-ANTI-AIR WARFARE
44	MARINE OFFICERS-AMPHIBIAN
43	MARINE OFFICERS-GROUND SUPPLY
42	Army Officers/Navy Officers/MARINE OFFICERS-COMMUNICATION
41	MARINE OFFICERS-AVIATION SUPPLY
40	
39	Air Force Officers/Peace Officers
38	MARINE OFFICERS-DATA SYSTEMS
37	
36	Physical Education Teachers/Recreation Leaders/Personnel Administrators
35	Purchasing Agents
34	Life Insurance Sales/School Administrators
33	Chamber of Commerce Executives/YMCA Directors/Elected Public Officials/ Credit Managers
32	Accountants/Executive Housekeepers/Nursing Home Administrators/ Food Service Managers/Foresters
31	IRS Agents/Department Store Managers/Physical Therapists
30	Public Administrators
29	Agribusiness Managers/Marketing Executives/Veterinarians/Lawyers/ Dietitians
28	Funeral Directors/Farmers
27	Business Education Teachers/Pharmacists/Nurses, R.N./Systems Analysts/Engineers
26	Radiologic Technologists/Optometrists/Public Relations Directors
25	Elementary Education Teachers/Special Education Teachers
24	Computer Programmers/Geologists/Geographers/Flight Attendants
23	Occupational Therapists
22	Chemists/Social Workers/Physicists/Speech Pathologists
21	Photographers/Reporters/Biologists
20	Nurses, LPN/Architects
19	
18	Sociologists/Librarians/Language Teachers
17	Cosmetologists
16	
15	Commercial Artists/Musicians
14	
13	Art Instructors
12	Fine Artists

Table B-4

Mean Scores on the Engineer-Set 3 (MIX) Scale

Mean Score	Occupational Sample
50	MARINE OFFICERS-ENGINEERS
49	
48	
47	
46	
45	
44	
43	
42	Engineers
41	Farmers/Foresters/Agribusiness Managers
40	Navy Officers
39	Architects/MARINE OFFICERS-TANK
38	MARINE OFFICERS-DATA SYSTEMS/MARINE OFFICERS-ARTILLERY/Air Force Officers
37	Geologists/Army Officers/Executive Housekeepers
36	MARINE OFFICERS-COMMUNICATION/Computer Programmers/Veterinarians/ Physicists/Elementary Education Teachers
35	Physical Education Teachers/Radiologic Technologists/Physical Therapists/ Peace Officers/MARINE OFFICERS-AMPHIBIAN/Occupational Therapists/ MARINE OFFICERS-INFANTRY
34	MARINE OFFICERS-AIR SUPPORT-DEFENSE-ANTI-AIR WARFARE/MARINE OFFICERS-AVIATION SUPPLY/Systems Analysts/Chemists/MARINE OFFICERS-GROUND SUPPLY/Purchasing Agents/ Photographers
33	Credit Managers/Funeral Directors/Dietitians/IRS Agents/Biologists
32	Optometrists/School Administrators/Recreation Leaders/Pharmacists/ Special Education Teachers/Nurses, R.N./Art Instructors
31	Accountants/Business Education Teachers/Food Service Managers/ Nursing Home Administrators/Fine Artists/Commercial Artists
30	Geographers/Personnel Administrators/Department Store Managers/ YMCA Directors
29	Marketing Executives/Elected Public Officials/Nurses, LPN/ Life Insurance Sales
28	Flight Attendants/Cosmetologists/Public Administrators/Musicians/ Lawyers
27	Librarians/Social Workers/Sociologists
26	Speech Pathologists/Chamber of Commerce Executives/Reporters
25	Language Teachers
24	Public Relations Directors

Table B-5

Mean Scores on the Tank-Set 1 (GRS) Scale

Mean Score	Occupational Sample
50	MARINE OFFICERS-TANK
49	
48	
47	
46	
45	MARINE OFFICERS-ENGINEER
44	MARINE OFFICERS-ARTILLERY/MARINE OFFICERS-INFANTRY
43	
42	
41	
40	MARINE OFFICERS-AMPHIBIAN
39	
38	MARINE OFFICERS-AVIATION SUPPLY/MARINE OFFICERS-GROUND SUPPLY/MARINE OFFICERS-AIR SUPPORT-DEFENSE-ANTI-AIR WARFARE/Army Officers
37	Navy Officers/MARINE OFFICERS-COMMUNCATION
36	Peace Officers
35	
34	
33	Air Force Officers/MARINE OFFICERS-DATA SYSTEMS
32	
31	Physical Education Teachers
30	
29	Executive Housekeepers
28	Recreation Leaders/Purchasing Agents/Foresters/Personnel Administrators/
27	Physical Therapists/School Administrators/YMCA Directors/Agribusiness Managers
26	Credit Managers
25	Veterinarians/Life Insurance Sales/IRS Agents/Farmers
24	Nurses, R.N./Nursing Home Administrators/Special Education Teachers
23	Elected Public Officials/Dietitians/Radiologic Technologists/ Chamber of Commerce Executives
22	Elementary Education Teachers/Public Administrators/Engineers/ Accountants/Lawyers/Occupational Therapists/Department Store Managers/ Food Service Managers
21	Funeral Directors/Pharmacists/Optometrists/Computer Programmers
20	Business Education Teachers/Systems Analysts/Marketing Executives
19	Flight Attendants/Geologists/Nurses, LPN
18	Photographers
17	Social Workers/Public Relations Directors
16	Architects/Reporters/Chemists
15	Physicists/Speech Pathologists/Biologists/Geographers
14	
13	Language Teachers
12	Cosmetologists/Librarians/Commercial Artists
11	Sociologists/Art Instructors
10	Musicians
9	
8	Fine Artists

Table B-6

Mean Scores on the Amphibian-Set 1 (GRS) Scale

Mean Score	Occupational Sample
50	MARINE OFFICERS-AMPHIBIAN
49	
48	
47	
46	
45	
44	
43	
42	
41	
40	
39	
38	MARINE OFFICERS-INFANTRY
37	MARINE OFFICERS-TANK
36	Peace Officers
35	MARINE OFFICERS-ENGINEER
34	
33	MARINE OFFICERS -ARTILLERY
32	
31	MARINE OFFICERS-AIR SUPPORT-DEFENSE-ANTI-AIR WARFARE
30	MARINE OFFICERS-COMMUNICATION/Recreation Leaders/Physical Education Teachers
29	Army Officers/MARINE OFFICERS-GROUND SUPPLY/
28	Navy Officers
27	Occupational Therapists/Air Force Officers
26	Personnel Administrators/Flight Attendants/YMCA Directors
25	Foresters/Public Relations Directors/Nurses, R.N./Chamber of Commerce Executives/Executive Housekeepers/Special Education Teachers/Photographers
24	Physical Therapists/Reporters/Commercial Artists/Art Instructors/ MARINE OFFICERS-AVIATION SUPPLY/Veterinarians/Funeral Directors/ Social Workers/Lawyers
23	Elementary Education Teachers/Farmers/Elected Public Officials/ Food Service Managers/Fine Artists/Purchasing Agents/Dietitians/ Nursing Home Administrators/Radiologic Technologists
22	Nurses, LPN/Life Insurance Sales/MARINE OFFICERS-DATA SYSTEMS/ Cosmetologists/Public Administrators
21	Speech Pathologists/IRS Agents/Musicians/Language Teachers/School Administrators/Department Store Managers
20	Credit Managers/Geologists/Geographers/Librarians
19	Business Education Teachers/Optometrists/Marketing Executives/ Architects/Pharmacists
18	Agribusiness Managers/Accountants/Biologists
17	Computer Programmers
16	Systems Analysts/Engineers
15	Sociologists
14	
13	
12	Physicists
11	Chemists

Table B-7

Mean Scores on the Amphibian-Set 2 (MRS) Scale

Mean Score	Occupational Sample
50	MARINE OFFICERS-AMPHIBIAN/
49	
48	
47	
46	
45	Fine Artists/Art Instructors/
44	
43	Commercial Artists/
42	Occupational Therapists/
41	Social Workers/Public Relations Directors/Flight Attendants/ Reporters/
40	Cosmetologists/Peace Officers/Language Teachers/Musicians/
39	Photographers/Special Education Teachers/
38	Recreation Leaders/Nurses, LPN/MARINE OFFICERS-INFANTRY/ Speech Pathologists/Librarians/
37	Chamber of Commerce Executives/Funeral Directors/Nurses, R.N./ YMCA Directors/Lawyers/
36	MARINE OFFICERS-TANK/Elected Public Officials/
35	Physical Education Teachers/Elementary Education Teachers/
34	Physical Therapists/Veterinarians/Personnel Administrators/ Public Administrators/Nursing Home Administrators/Department Store Managers/Architects/Food Service Managers/Farmers/ Dietitians/
33	Sociologists/Executive Housekeepers/Geographers/Foresters/ MARINE OFFICERS-ENGINEER/
32	Radiologic Technologists/Life Insurance Sales/MARINE OFFICERS-ARTILLERY/
31	MARINE OFFICERS-AIR SUPPORT-DEFENSE-ANTI-AIR WARFARE/Pharmacists/ Biologists/MARINE OFFICERS-COMMUNICATION/Army Officers/MARINE OFFICERS-GROUND SUPPLY/School Administrators/
30	Purchasing Agents/ Optometrists/Business Education Teachers/Geologists/Marketing Executives/Air Force Officers/Agribusiness Managers/
29	Navy Officers/MARINE OFFICERS-AVIATION SUPPLY/IRS Agents/
28	Credit Managers/
27	
26	Computer Programmers/Accountants/
25	
24	Systems Analysts/
23	Engineers/MARINE OFFICERS-DATA SYSTEMS/
22	Physicists/Chemists/

Table B-8

Mean Scores on the Communication -- Set 2 (MRS) Scale

Mean Score	Occupational Sample
51	Chemists/Physicists
50	MARINE OFFICERS-COMMUNICATION
49	MARINE OFFICERS-DATA SYSTEMS
48	Engineers
47	Biologists
46	Systems Analysts/Computer Programmers
45	Radiologic Technologists
44	Executive Housekeepers/Sociologists
43	Navy Officers/Geologists
42	Geographers/Army Officers/Nurses, LPN/Speech Pathologists/ Elementary Education Teachers/IRS Agents/School Administrators/ Purchasing Agents/Language Teachers/Air Force Officers/ Librarians/Nurses, R.N./MARINE OFFICERS-AVIATION SUPPLY
41	Pharmacists/Dietitians/Credit Managers
40	Foresters/YMCA Directors/Public Administrators/Occupational Therapists/MARINE OFFICERS-AIR SUPPORT-DEFENSE-ANTI-AIR WARFARE/ MARINE OFFICERS-ENGINEER/Social Workers/Physical Therapists/ Agribusiness Managers/Nursing Home Administrators/Business Education Teachers
39	Special Education Teachers/Optometrists/Marketing Executives
38	Musicians/Personnel Administrators/Accountants/MARINE OFFICERS-GROUND SUPPLY/MARINE OFFICERS-TANK/MARINE OFFICERS-ARTILLERY/ Physical Education Teachers/Farmers
37	Funeral Directors/Architects/Peace Officers/Photographers/ Veterinarians
36	Reporters/Chamber of Commerce Executives
35	Recreation Leaders/Art Instructors/Public Relations Directors/ Elected Public Officials/Department Store Managers
34	Cosmetologists/Life Insurance Sales/MARINE OFFICERS-INFANTRY/ Lawyers/MARINE OFFICERS-AMPHIBIAN/Food Service Managers/Flight Attendants
33	Fine Artists
32	Commercial Artists

Table B-9

Mean Scores on the Ground Supply-Set 3 (MIX) Scale

Score	Occupational Sample
54	Business Education Teachers
53	
52	
51	Department Store Managers
50	Chamber of Commerce Executives/MARINE OFFICERS-GROUND SUPPLY/ Life Insurance Sales
49	
48	Food Service Managers/Credit Managers/Nursing Home Administrators
47	Accountants/Personnel Administrators/Purchasing Agents
46	Agribusiness Managers/Marketing Executives
45	MARINE OFFICERS-AVIATION SUPPLY/YMCA Directors/School Administrators/Public Relations Directors/Funeral Directors/ Dietitians
44	Elected Public Officials/IRS Agents/Cosmetologists
43	Public Administrators/Flight Attendants
42	Executive Housekeepers/Recreation Leaders
41	
40	Lawyers/Language Teachers/Pharmacists
39	Librarians/Social Workers
38	Army Officers/Air Force Officers/Systems Analysts/Nurses, LPN/ MARINE OFFICERS-INFANTRY/Special Education Teachers/Elementary Education Teachers
37	Reporters/Art Instructors/MARINE OFFICERS-ARTILLERY/MARINE OFFICERS-DATA SYSTEMS/Optometrists/MARINE OFFICERS-AIR SUPPORT-DEFENSE-ANTI-AIR WARFARE/Navy Officers
36	Speech Pathologists/Farmers/Physical Education Teachers/ Geographers
35	Photographers/Commercial Artists/Peace Officers/Architects/ Sociologists/MARINE OFFICERS-TANK
34	Nurses, R.N./MARINE OFFICERS-COMMUNICATION/Computer Programmers/ MARINE OFFICERS-AMPHIBIAN/Radiologic Technologists/Foresters/ Musicians
33	Physical Therapists/Occupational Therapists/Veterinarians/ MARINE OFFICERS-ENGINEER
32	Engineers
31	Fine Artists
30	
29	Chemists/Biologists
28	Geologists
27	Physicists

Table B-10

Mean Scores on the Aviation Supply-Set 3 (MIX) Scale

Mean Score	Occupational Sample
50	MARINE OFFICERS-AVIATION SUPPLY
49	
48	
47	
46	
45	Life Insurance Sales/Chamber of Commerce Executives
44	
43	Business Education Teachers/Department Store Managers/ Flight Attendants/Nursing Home Administrators
42	Public Administrators/School Administrators/ Purchasing Agents/Personnel Administrators YMCA Directors/Credit Managers/Elected Public Officials
41	Dietitians/Cosmetologists/Public Relations Directors/ Marketing Executives
40	Food Service Managers/MARINE OFFICERS-GROUND SUPPLY/IRS Agents/ Accountants
39	Lawyers/Funeral Directors/Recreation Leaders
38	Social Workers/Executive Housekeepers/Special Education Teachers/ Speech Pathologists
37	Agribusiness Managers/Nurses, LPN
36	Pharmacists/Sociologists/Language Teachers/Systems Analysts/ MARINE OFFICERS-DATA SYSTEMS/Army Officers/Air Force Officers/ Elementary Education Teachers
35	Navy Officers/Librarians/Optometrists
34	Nurses, R.N./Reporters/Peace Officers/Occupational Therapists/ Art Instructors/Radiologic Technologists/Photographers/ Musicians/Physical Therapists/Computer Programmers
33	Physical Education Teachers/MARINE OFFICERS-ARTILLERY/ MARINE OFFICERS-INFANTRY/MARINE OFFICERS-TANK/MARINE OFFICERS-COMMUNICATION/Architects
32	Commercial Artists/MARINE OFFICERS-AIR SUPPORT-DEFENSE-ANTI-AIR WARFARE/Engineers/Geographers/Veterinarians
31	Chemists
30	MARINE OFFICERS-ENGINEER
29	Foresters/Physicists/Farmers/Biologists/Fine Artists MARINE OFFICERS-AMPHIBIAN
28	
27	Geologists

Table B-11

Mean Scores on the Ground and Aviation Supply-Set 3 (MIX) Scale

Mean Score	Occupational Sample
54	Business Education Teachers
53	Department Store Managers
52	
51	Chamber of Commerce Executives/Life Insurance Sales
50	MARINE OFFICERS-GROUND SUPPLY
49	Credit Managers/Nursing Home Administrators/Food Service Managers
48	Purchasing Agents/MARINE OFFICERS-AVIATION SUUPLY/Personnel Administrators/Accountants
47	Agribusiness Managers/Marketing Executives
46	Dietitians/School Administrators/YMCA Directors/Funeral Directors
45	Cosmetologists/Public Relations Directors/IRS Agents
44	Elected Public Officials/Public Administrators/Executive Housekeepers/Flight Attendants
43	
42	Recreation Leaders
41	Pharmacists/Lawyers
40	Language Teachers
39	Army Officers/Social Workers/Nurses, LPN/Librarians/Air Force Officers/Systems Analysts
38	Special Education Teachers/Elementary Education Teachers/ MARINE OFFICERS-INFANTRY/MARINE OFFICERS-DATA SYSTEMS/Navy Officers/Optometrists
37	MARINE OFFICERS-ARTILLERY/MARINE OFFICERS-AIR SUPPORT-DEFENSE-ANTI-AIR WARFARE/Speech Pathologists/Art Instructors/Reporters
36	Nurses, R.N./Photographers/Physical Education Teachers/ Peace Officers/MARINE OFFICERS-TANK
35	Architects/Computer Programmers/Farmers/Commerical Artists/ Geographers/Radiologic Technologists/Sociologists/MARINE OFFICERS-COMMUNICATION
34	Occupational Therapists/Physical Therapists/Veterinarians/ Musicians/Foresters/MARINE OFFICERS-ENGINEER
33	Engineers/MARINE OFFICERS-AMPHIBIAN
32	
31	Chemists/Fine Artists
30	Biologists
29	
28	Geologists/Physicists

Table B-12

Mean Scores on the Data Systems-Set 3 (MIX) Scale

Mean Score	Occupational Sample
55	Physicists
54	Chemists
53	
52	
51	Engineers
50	MARINE OFFICERS-DATA SYSTEMS/Systems Analysts
49	
48	Computer Programmers
47	Geologists/Biologists
46	
45	
44	
43	
42	Accountants
41	Architects/Radiologic Technologists/Sociologists/Geographers/ Optometrists
40	Foresters/Pharmacists
39	Marketing Executives/Business Education Teachers
38	Musicians/IRS Agents/Farmers/Air Force Officers
37	Credit Managers/Dietitians/Veterinarians/Librarians/ Agribusiness Managers
36	Navy Officers/Purchasing Agents/Elementary Education Teachers/ Nurses, LPN/Speech Pathologists/Physical Therapists
35	Fine Artists/Executive Housekeepers/MARINE OFFICERS-COMMUNICATION
34	Commercial Artists/Photographers/Cosmetologists/Nurses, R.N./ MARINE OFFICERS-AVIATION SUPPLY/Army Officers/School Administrators/ Department Store Managers/Public Administrators
33	Food Service Managers/Nursing Home Administrators/MARINE OFFICERS-GROUND SUPPLY
32	Language Teachers/Occupational Therapists/Special Education Teachers/Art Instructors/MARINE OFFICERS-ENGINEERS/Personnel Administrators/MARINE OFFICERS-AIR SUPPORT-DEFENSE-ANTI-AIR WARFARE
31	Funeral Directors/Physical Education Teachers
30	Flight Attendants/Reporters/Lawyers/YMCA Directors/Social Workers
29	MARINE OFFICERS-ARTILLERY/Life Insurance Sales
28	Recreation Leaders/Chamber of Commerce Executives
27	Public Relations Directors
26	Elected Public Officials/Peace Officers/MARINE OFFICERS-TANK
25	
24	
23	MARINE OFFICERS-INFANTRY
22	
21	MARINE OFFICERS-AMPHIBIAN

Table B-13

Mean Scores on the Air Support-Defense-Anti-Air Warfare-Set 2 (MRS)

Mean Score	Occupational Sample
50	MARINE OFFICERS-AIR SUPPORT-DEFENSE-ANTI-AIR WARFARE/School Administrators
49	Nursing Home Administrators
48	Business Education Teachers/Personnel Administrators/MARINE OFFICERS-GROUND SUPPLY/Chamber of Commerce Executives/ Life Insurance Sales
47	MARINE OFFICERS-GROUND AND AVIATION SUPPLY/Credit Managers/ Funeral Directors
46	YMCA Directors/Purchasing Agents/Agribusiness Managers/ Dietitians
45	Executive Housekeepers/MARINE OFFICERS-AVIATION SUPPLY/ Department Store Managers
44	IRS Agents/Elected Public Officals/Recreation Leaders/Food Service Managers
43	Pharmacists/Nurses, LPN/Air Force Officers/Army Officers/ Public Administrators/Special Education Teachers
42	Elementary Education Teachers/Marketing Executives
41	MARINE OFFICERS-ARTILLERY/Social Workers/Accountants/ Public Relations Directors/Navy Officers/MARINE OFFICERS-INFANTRY/MARINE OFFICERS-COMMUNICATIONS/Speech Pathologists/ Flight Attendants
40	Nurses, R.N./Radiologic Technologists/MARINE OFFICERS-AMPHIBIAN/ MARINE OFFICERS-DATA SYSTEMS/Physical Education Teachers/Peace Officers/MARINE OFFICERS-TANK/MARINE OFFICERS-ENGINEER/ Language Teachers
39	Cosmetologists/Lawyers
38	Systems Analysts/Optometrists/Physical Therapists
37	Occupational Therapists/Librarians
36	Computer Programmers/Farmers/Veterinarians/Photographers
35	Foresters/Engineers
34	Art Instructors/Sociologists/Geographers
33	Reporters/Musicians/Chemists
32	Architects/Biologists
31	Commercial Artists
30	
29	Physicists
28	Geologists
27	Fine Artists

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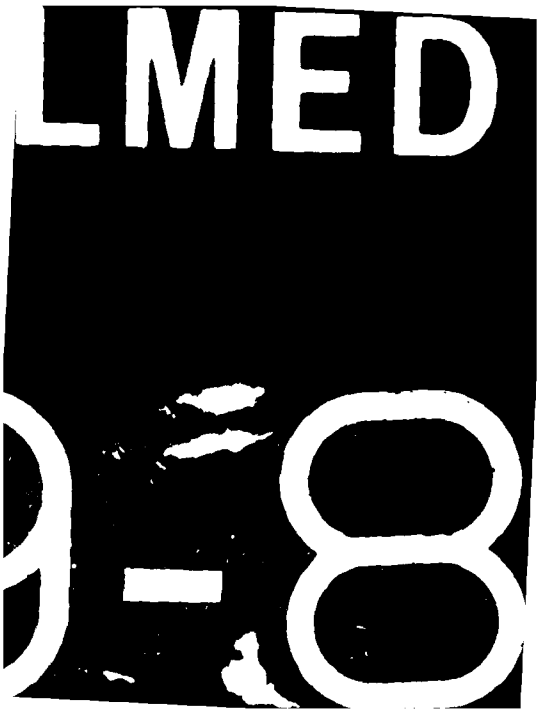
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